

## NASA Virtual Institutes: International Bridges for Space Exploration

NASA created the first virtual institute, the NASA Astrobiology Institute (NAI), in 2009 with an aim toward bringing together geographically disparate and multidisciplinary teams toward the goal of answering broad questions in the then-new discipline of astrobiology. With the success of the virtual institute model, NASA then created the NASA Lunar Science Institute (NLSI) in 2008 to address questions of science and human exploration of the Moon, and then the NASA Aeronautics Research Institute (NARI) in 2012 which addresses key questions in the development of aeronautics technologies. With the broadening of NASA's human exploration targets to include Near Earth Asteroids and the moons of Mars as well as the Moon, the NLSI morphed into the Solar System Exploration Research Virtual Institute (SSERVI) in 2012. SSERVI funds domestic research teams to address broad questions at the intersection of science and human exploration, with the underlying principle that science enables human exploration, and human exploration enables science. Nine domestic teams were funded in 2014 for a five-year period to address a variety of different topics, and nine international partners (with more to come) also work with the U.S. teams on a variety of topics of mutual interest. The result is a robust and productive research infrastructure that is not only scientifically productive but can respond to strategic topics of domestic and international interest, and which develops a new generation of researchers. This is all accomplished with the aid of virtual collaboration technologies which enable scientific research at a distance. The virtual institute model is widely applicable to a range of space science and exploration problems.